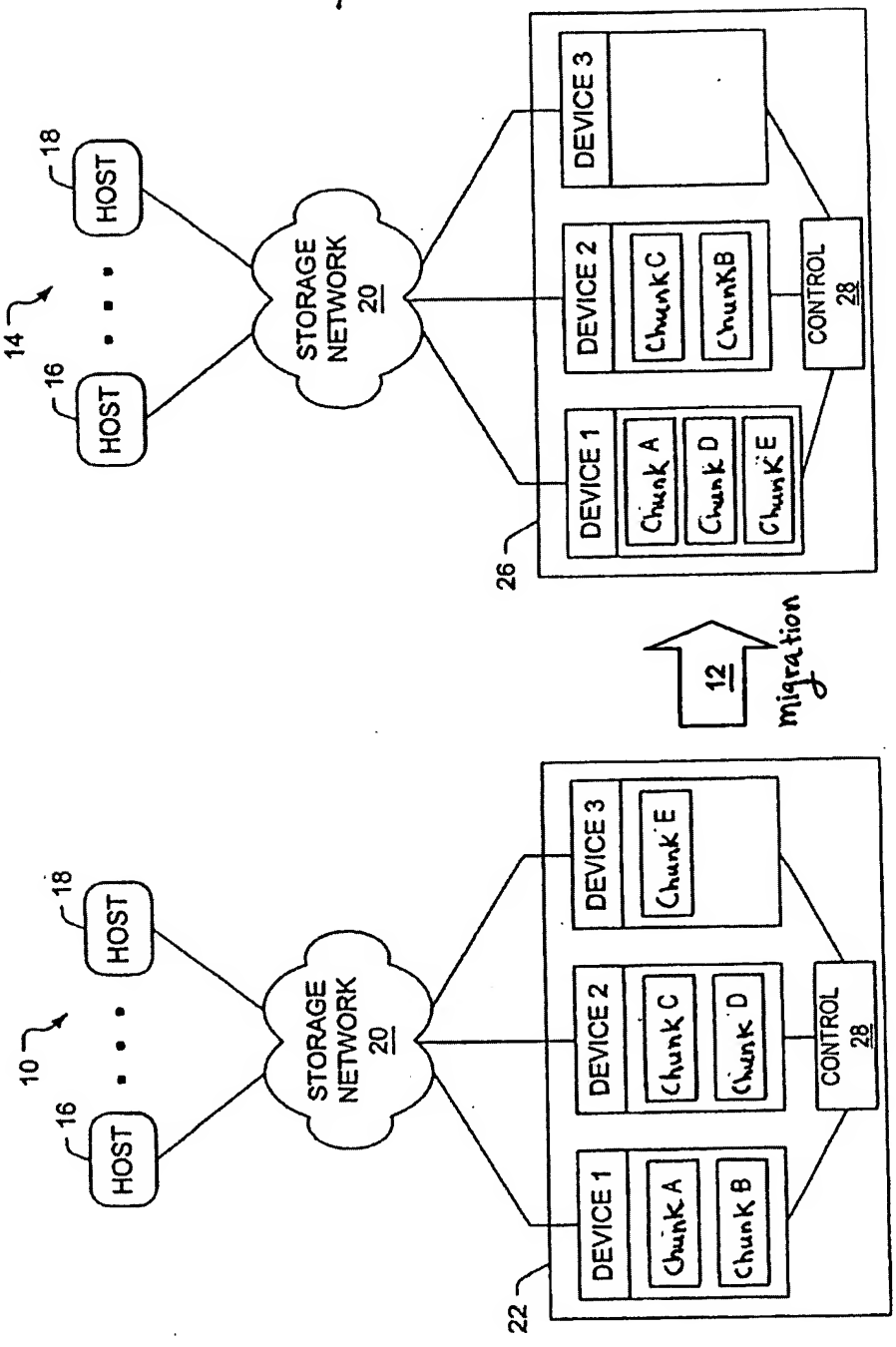
Figure 1


HOST
18
HOST
16
14
STORAGE NETWORK 20
DEVICE 3
DEVICE 2
Chunk C
Chunk B
CONTROL 28
DEVICE 1
Chunk A
Chunk D
Chunk E
26
12
migration
HOST
18
HOST
16
10
STORAGE NETWORK 20
DEVICE 3
Chunk E
DEVICE 2
Chunk C
Chunk D
CONTROL 28
DEVICE 1
Chunk A
Chunk B
22

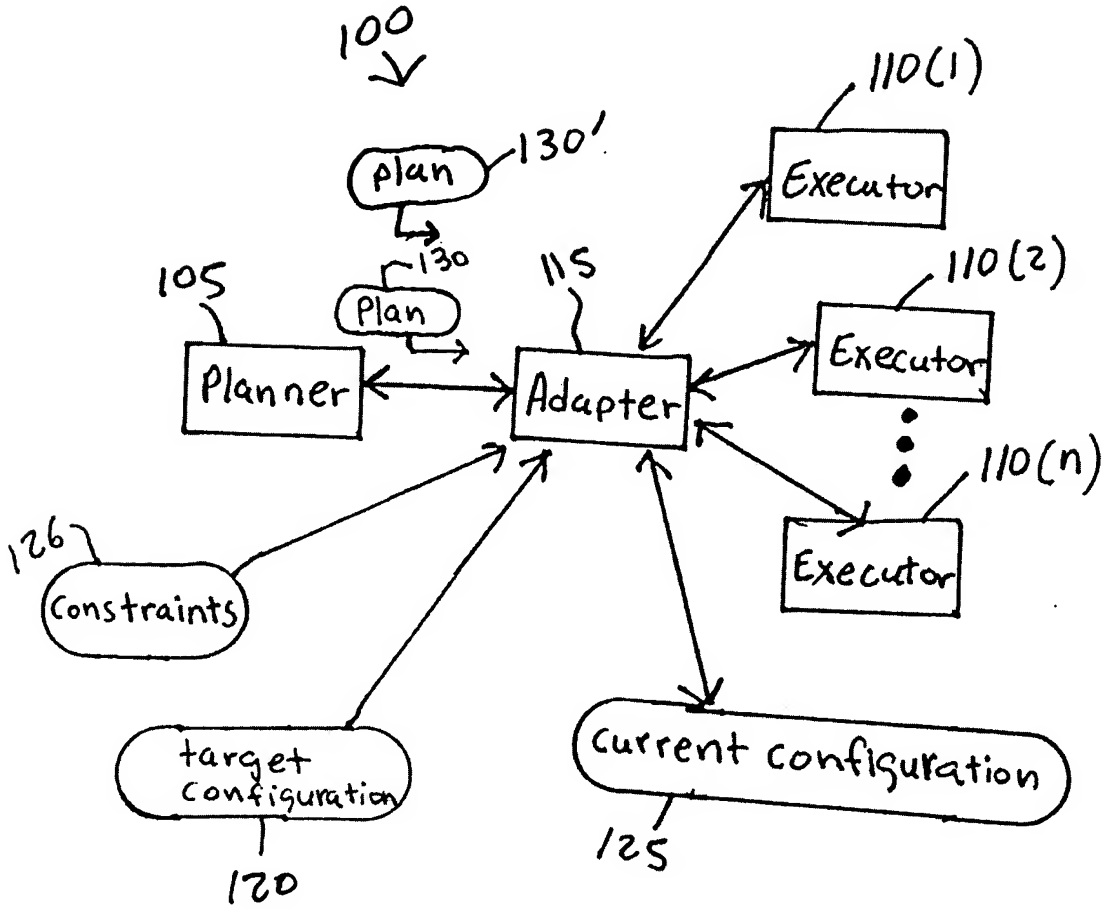

100
plan
130'
130
Plan
105
Planner
115
Adapter
110(1)
Executor
110(2)
Executor
110(n)
Executor
126
Constraints
target configuration
120
current configuration
125

Figure 2

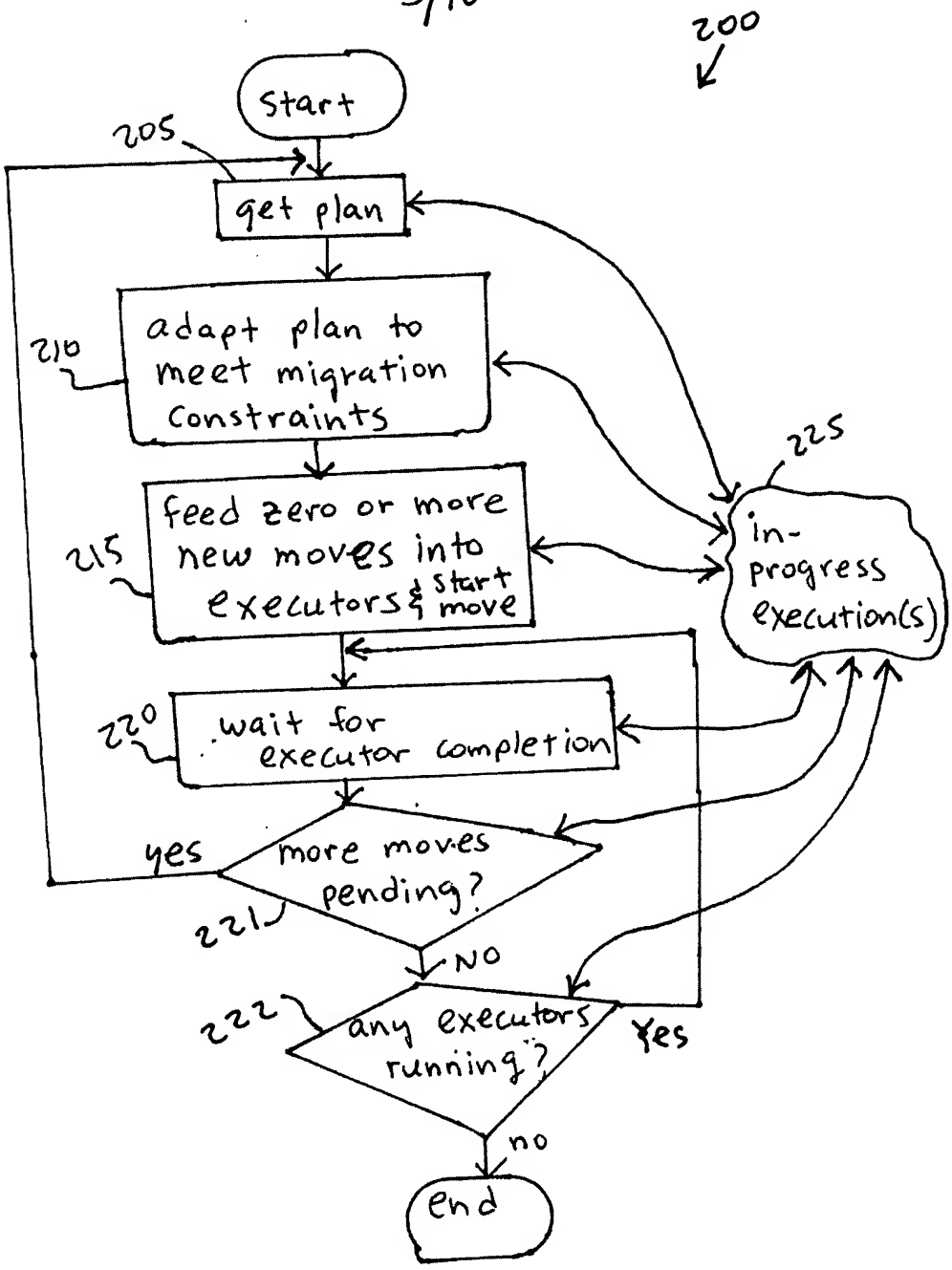

200
Start
205
get plan
210
adapt plan to meet migration Constraints
215
feed zero or more new moves into executors & start move
225
in-progress execution(s)
220
wait for executor completion
yes
more moves pending?
221
NO
222
any executors running?
Yes
no
End

Figure 3A

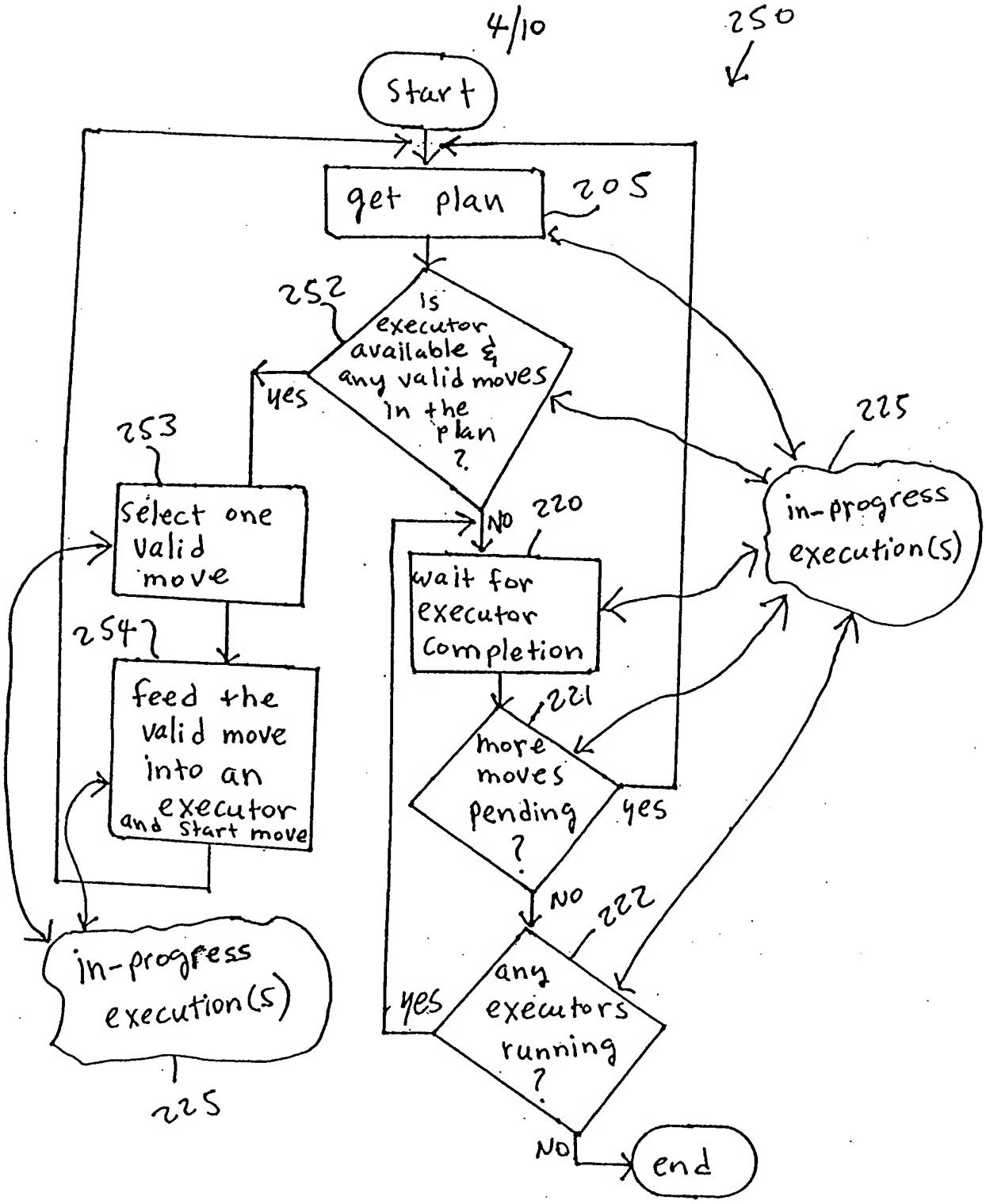

4/10
250
Start
get plan
205
252
Is executor available & any valid moves in the plan ?
yes
NO
253
Select one valid move
254
feed the valid move into an executor and start move
220
wait for executor Completion
221
more moves pending ?
yes
NO
222
any executors running ?
yes
NO
end
225
in-progress execution(s)
225
in-progress execution(s)

Figure 3B

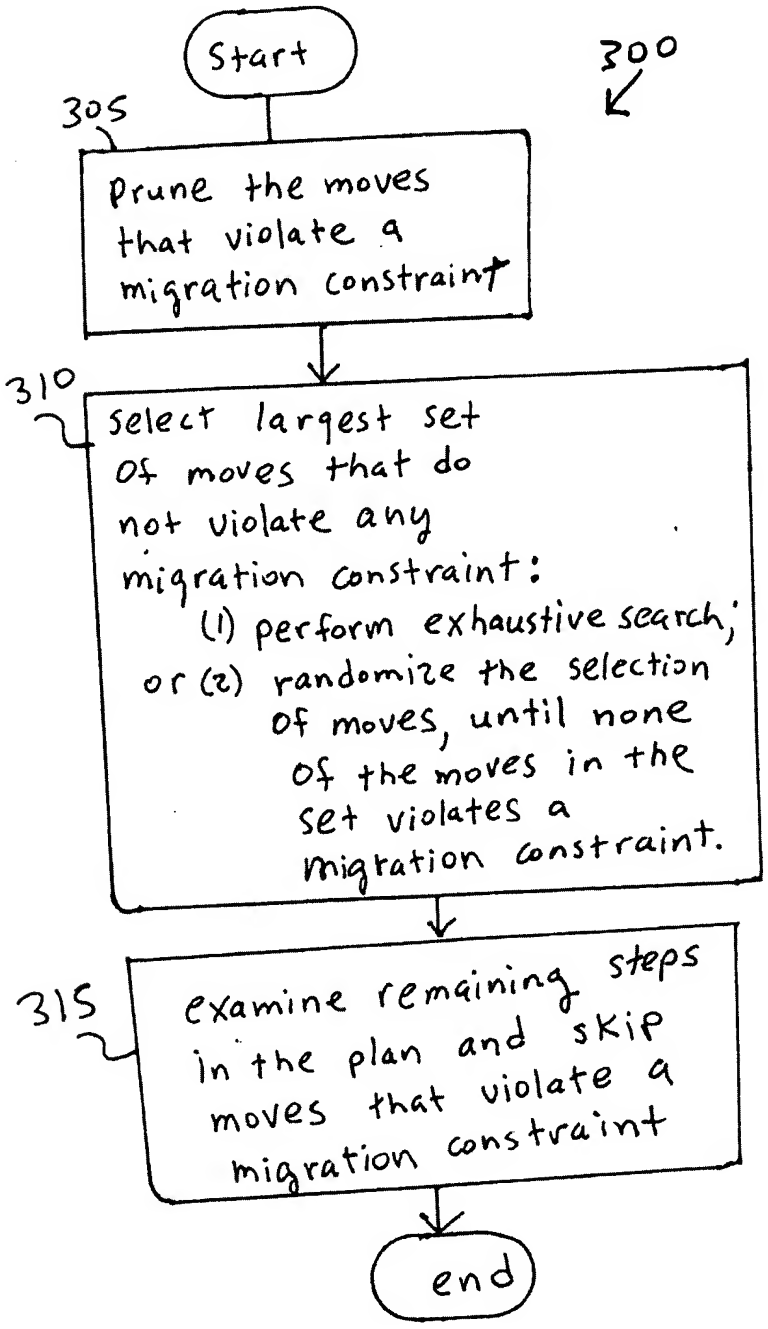
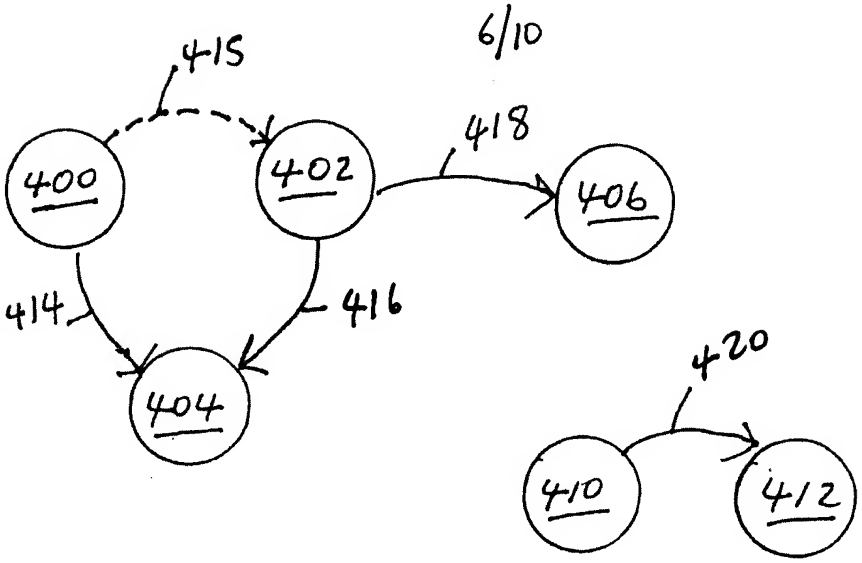
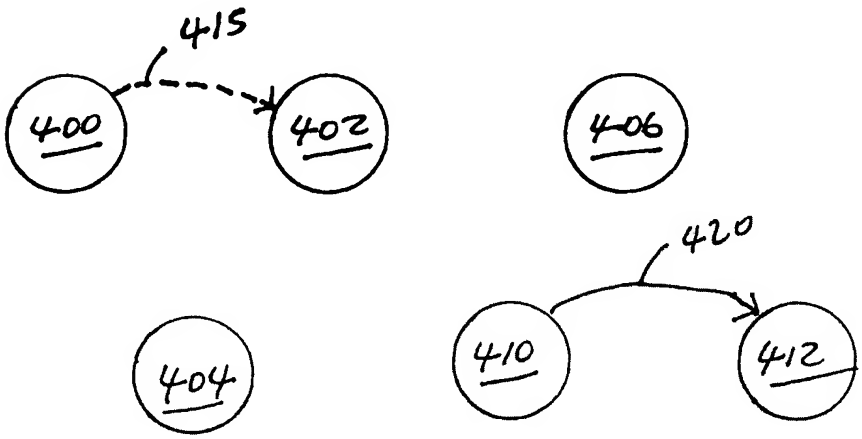

Start
300
305
Prune the moves that violate a migration constraint
310
Select largest set of moves that do not violate any migration constraint:
(1) perform exhaustive search; or (2) randomize the selection of moves, until none of the moves in the set violates a migration constraint.
315
examine remaining steps in the plan and skip moves that violate a migration constraint
end

Figure 4



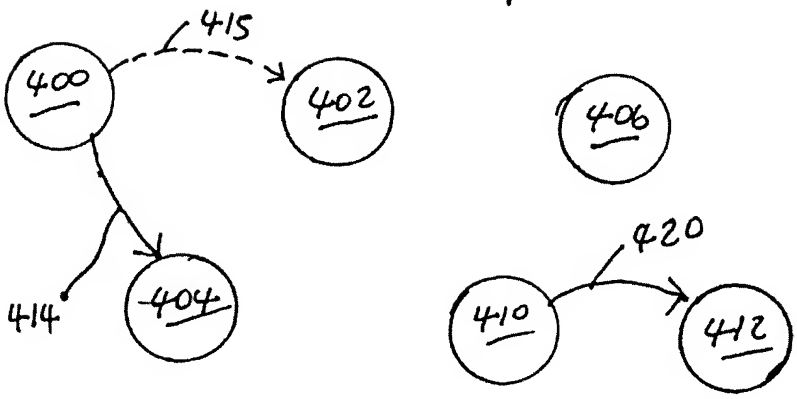
in-progress move from node 400 to node 402 and with constraint of at-most-one-write rule

Figure 5A



in-progress move from node 400 to node 402 and with constraint of at-most-one-access rule

Figure 5B



in-progress move from node 400 to node 402 and with constraint of 2-reads and one-write rule

Figure 5C

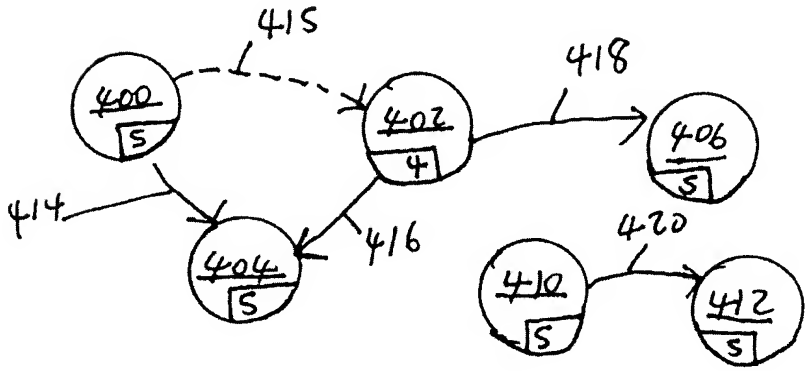


Figure 5D

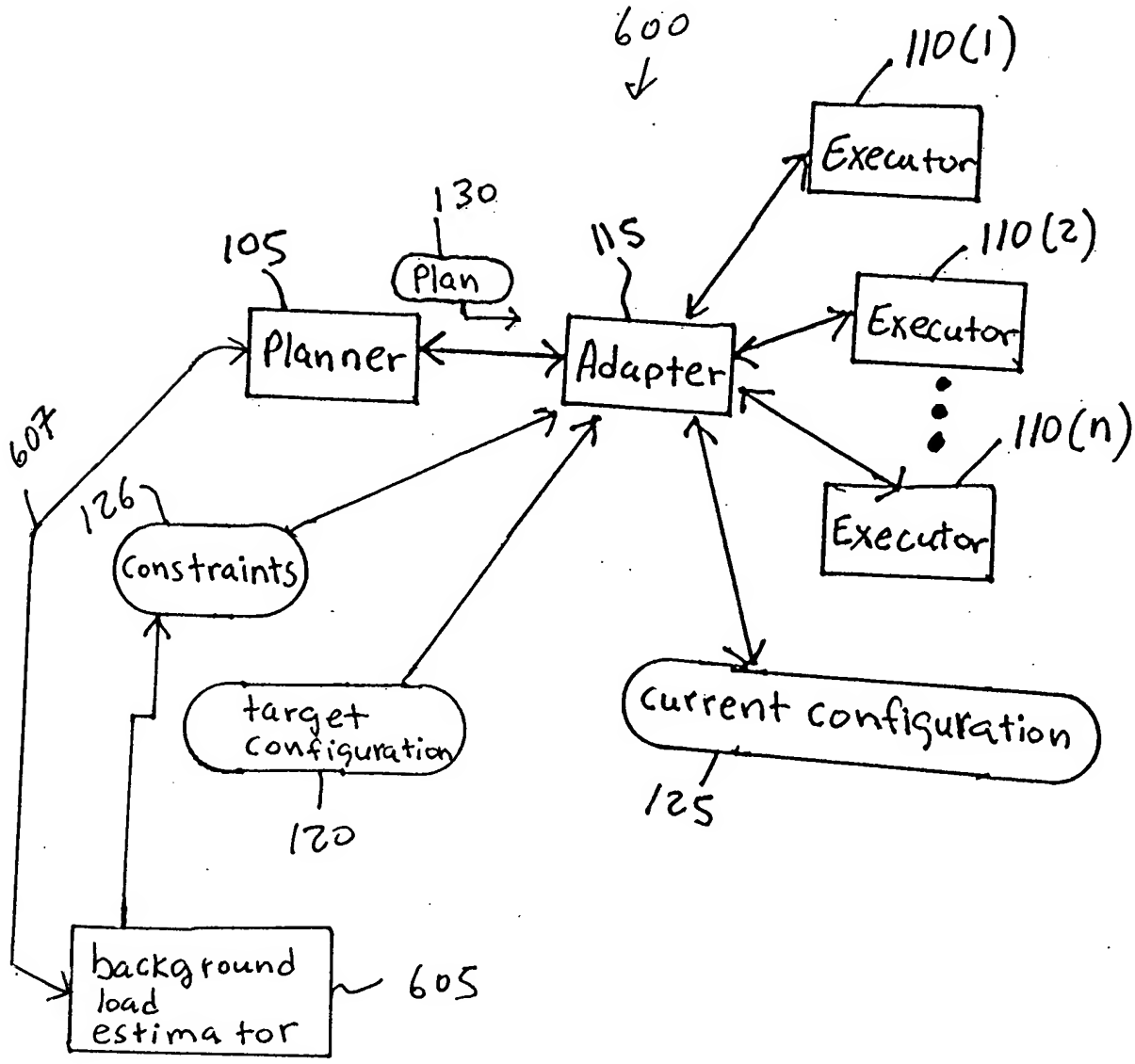

600
110(1)
Executor
130
105
Plan
115
110(2)
Executor
Planner
Adapter
607
110(n)
126
Executor
Constraints
target configuration
120
current configuration
125
background load estimator
605

Figure 6

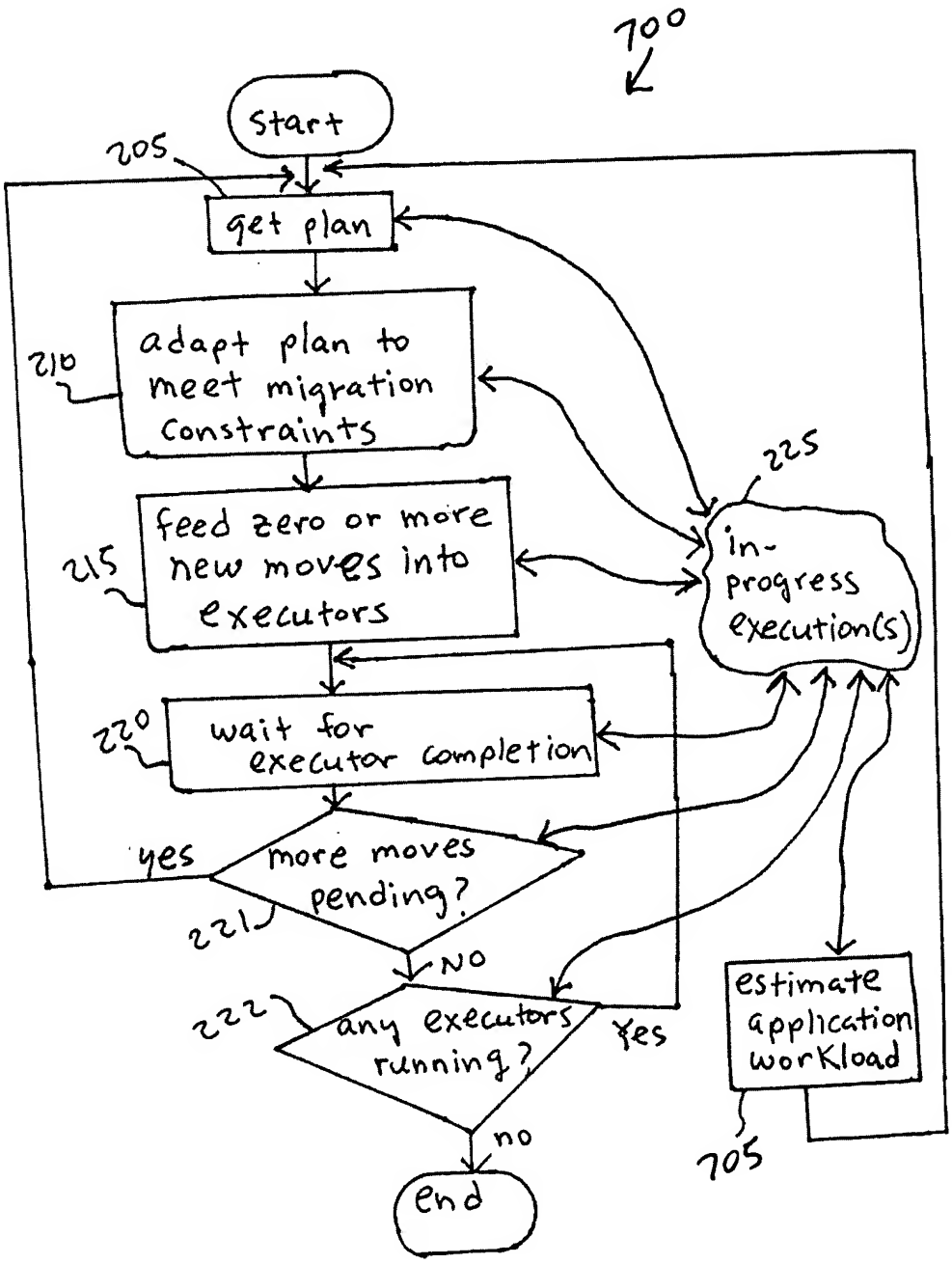

700
Start
205
get plan
210
adapt plan to meet migration constraints
215
feed zero or more new moves into executors
225
in-progress execution(s)
220
wait for executor completion
yes
more moves pending?
221
NO
222
any executors running?
yes
no
End
estimate application workload
705

Figure 7A

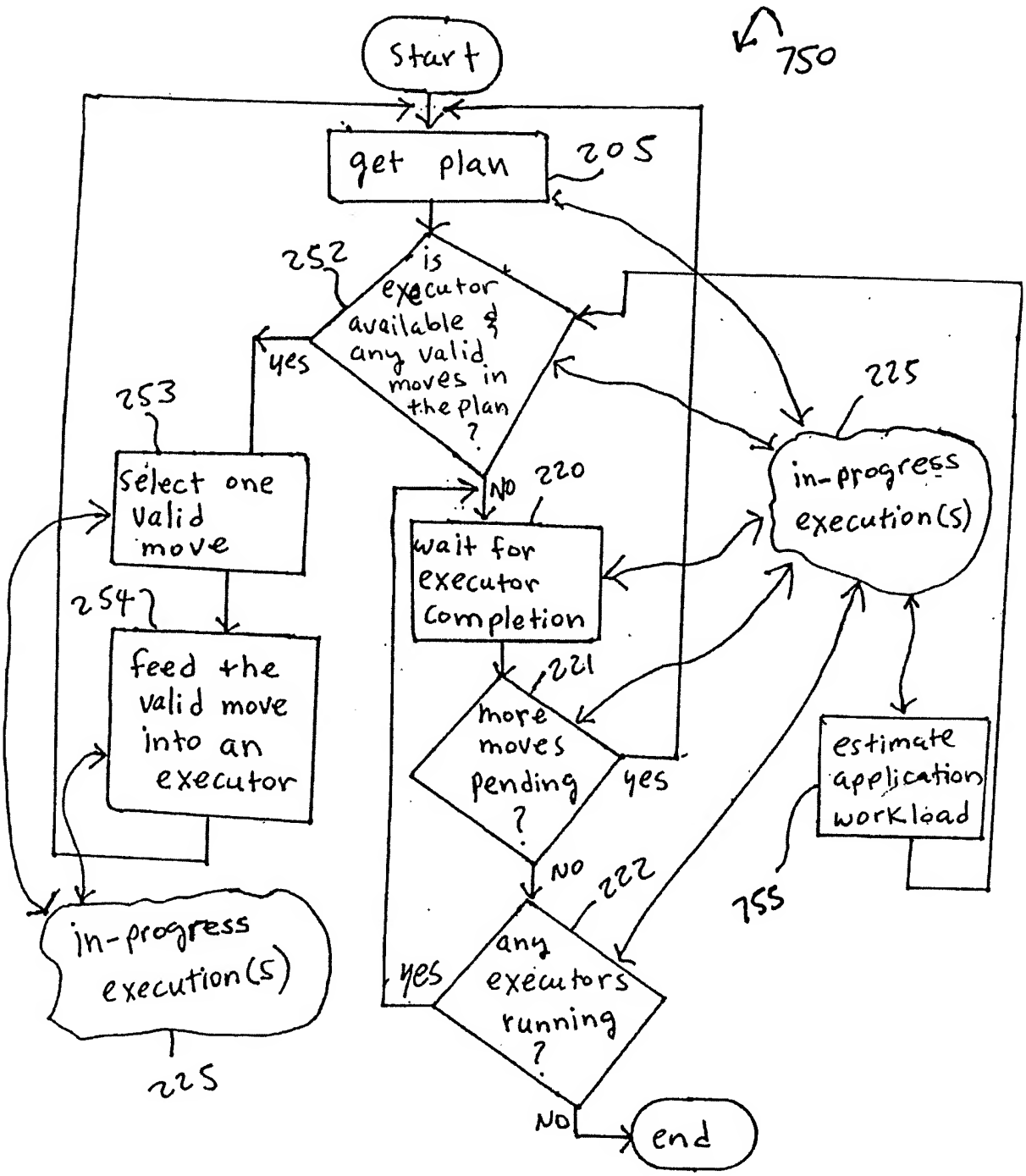

Start
750
get plan
205
252
is executor available & any valid moves in the plan ?
yes
NO
253
Select one valid move
254
feed the valid move into an executor
220
wait for executor completion
221
more moves pending ?
yes
NO
222
any executors running ?
yes
NO
end
225
in-progress execution(s)
225
in-progress execution(s)
estimate application workload
755

Figure 7B